Art. XI.—*Contributions to the Pathological Anatomy of the Nervous System.* By E. C. Seguin, M.D., of New York.

I. *Examination of the Cervical Sympathetic Nerve in a Case of Unilateral Sweating of the Head.*—Some attention has of late years been paid to this interesting symptom, and various explanations of its mode of production have been offered.[1] In many cases, mechanical interference (pressure of tumor or aneurism) with the sympathetic nerve is readily made out. In others, the patients' antecedents and the results of treatment warrant the diagnosis of a sympathetic process, one associated with disorder of the stomach or other distant organ. But there are still other cases, in which, the above explanation failing, we are obliged to have recourse to the unmeaning phrase of idiopathic disorder. The instance which I reproduce was of this last kind, and to my knowledge is the only one of its class in which a microscopical examination of the sympathetic chain has been made.

The subject observed by me (a male about 50 years of age) had exhibited one-sided sweating of the face and neck for a considerable number of years; in which period the right half of the face and neck never showed any moisture, not even when the left side was bathed in perspiration. The abnormality, therefore, consisted in the abolition of sweating on one side of the head. When the patient first came under my observation he was in a cachectic state, which ultimately proved to be cancerous, an abdominal tumour soon becoming apparent. On the evening when the patient's wife first informed me of the one-sided sweating, he had been suffering severe abdominal pain, and, in consequence, was perspiring nearly everywhere. The lower and upper limbs and the trunk were moderately moist, the left side of the face (forehead especially) was dripping wet; while immediately beyond the median line the skin of the right side was perfectly dry. The pupils were equal in size and in mobility. A careful estimate of the surface temperature on the temporal region of either side was made by means of Dr. E. Seguin's surface thermometer, but gave no differential result.

On the 7th of May the patient died of exhaustion. The autopsy was made on the 8th, sixteen hours after death, the body having been perfectly preserved in ice. Immense cancerous masses were found in the abdominal cavity, affecting principally the mesenteric glands. Another deposit, in the shape of a rounded tumour as large as a small orange, was met with behind the left clavicle, externally to the sterno-mastoid muscle. Microscopic examination showed the tumour to be composed of carcinomatous tissue.

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[1] Consult a good paper on the subject by Roberts Bartholow, M.D., in the *Quarterly Journal of Psychological Medicine*, vol. iii. (1869) pp. 134–144.

The sympathetic chain of the neck was carefully removed on both sides, and very shortly afterward immersed in an artificially iodized serum. During the dissection it was observed that the right nerve was unusually adherent to the sheath of the vessels and pneumogastric nerve, from a point on a level with the bifurcation of the carotid artery nearly up to the superior sympathetic ganglion. The post-clavicular tumour did not involve the left nerve in any way. Examination May 9th, twenty hours after the autopsy. To the naked eye the right chain exhibits no middle ganglion, and presents a marked injection of the nerve just above the superior ganglion, in part corresponding to the adhesions already described. The left chain appears absolutely normal (has three ganglia).

Microscopical examination of a considerable number of preparations from the right superior ganglion, teased in serum, or stained with carmine: no granular or amyloid bodies can be detected, nor any abnormality of the connective tissue; the nerve fibres are normal, and the nerve cells alone depart from the healthy standard. This alteration consists in a marked increase of the granular yellow pigment which normally occupies one-sixth to one-fourth of the body of the ganglion cells. In many cells the pigment is more than equal to one-half the cell bulk; in quite a number it takes up nearly the whole cell body, and almost conceals the nucleus. Preparations from that part of the nerve which should have presented a ganglion contain abundant ganglion cells, nearly all with an abnormal amount of pigment. Only a portion of the inferior ganglion remains; but preparations from that show precisely similar appearances. Similarly prepared specimens from various parts of the nerve trunk exhibit perfectly normal nerve fibres, nearly all myelinic, of very variable diameters. No evidence of proliferation of the connective tissue can be seen. The various vessels met with in the above preparations contain large quantities of blood-globules, but their coats are healthy.

Left nerve—Nearly every part of this chain is exâmined in the same manner; its nerve fibres, bloodvessels (not injected), connective tissue, and ganglion cells appear in precisely the same state as similar elements of the right chain, *i. e.*, the first three are perfectly normal, the last are very granular.

Consequently, the only lesion found in these nerves is symmetrically developed, and can, consequently, bear no relation to the one-sided arrest of sweating observed during life. In another case it would be highly desirable to examine the cervical portion of the spinal cord as well as the sympathetic itself.

The following measurements are obtained from estimating the size of very numerous elements on both sides. Ganglion cells range from .025 mm. to .062 mm. in diameter; nerve fibres from .001 mm. to .02 mm.

II. *Double Central Canal in part of an otherwise normal Spinal Cord.*—While examining sections from various parts of the spinal cord of a patient who had died of the affection known as general paresis of the insane, I came across unmistakable evidences of the existence of two central canals, most distinct in the cervical enlargement.

(*a*) In a section made just below the apex of the fourth ventricle, the central canal is single and open, exhibiting very distinct cells. Its long diameter, antero-posterior, equals .53 mm.; its short diameter .052 mm.

(*b*) In a section from a point 3 c. below decussation of pyramids, a single central canal, blocked up by distorted epithelial cells, is seen.

(*c*) Section from the upper part of the cervical enlargement shows two small, beautiful central canals, lined with nearly perfect epithelium. The interval between the two canals equals .03 mm. The posterior median fissure comes down to a point opposite the middle of this interval. The lumen of one canal measures transversely .049 mm.; antero-posteriorly .018 mm. The transverse diameter of the lumen of the other canal measures .07 mm.; the antero-posterior .012. The epithelial cells have an average length of about .01 mm. The epithelium is entirely preserved around the left canal, but is a little frayed at the inner angle of the right. Between the canals is a shapeless mass of cellular bodies, such as usually lie about the central canal.

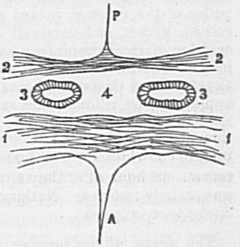

Diagram of Median Part of Transverse Section of Cervical Cord. P. Posterior median fissure. A. Anterior median fissure. 1. Anterior commissure. 2. Posterior commissure. 3. Central canals lined with distinct epithelial cells. 4. Interval filled up with dense cellular structure such as surrounds central canal usually.

(*d*) A section from the lower part of the cervical enlargement shows traces of two canals, but the epithelium is not in as good condition, and a lumen is distinct only on one side. Intervening and surrounding cellular structure not as dense as in (*c*).

(*e*) Section from the mid-dorsal region exhibits a confused mass of cells in the centre of the commissure, with one distinct, irregular aperture, and another very imperfect one at a distance of .08 mm.

(*f*) In the lumbar enlargement nothing is found but one common cellular (not epithelial) central mass without lumen.

(*g*) At a point 3 c. above end of cord no distinct epithelium or canal is visible.